

WE CLAIM:

1. A method for the synergistic treatment of cancer comprising administering to a mammal in need thereof a therapeutically effective amount of a cytotoxic agent in combination with a therapeutically effective amount of an IGF1R inhibitor in amounts sufficient to achieve synergistic effects.
2. The method according to claim 1 wherein the cytotoxic agent comprises radiation therapy.
3. The method according to claim 1, wherein the cytotoxic agent is administered prior to the IGF1R inhibitor.
4. The method according to claim 1 wherein the cytotoxic agent is administered subsequent to the IGF1R inhibitor.
5. The method according to claim 1 for the synergistic treatment of cancerous solid tumors.
6. The method according to Claim 1 wherein the cytotoxic agent is a microtubule-affecting agent; a natural product or derivative thereof, or a platinum coordination complex.
7. The method according to claim 6 wherein said microtubule-affecting agent is allocolchicine, Halichondrin B, colchicine, colchicine derivatives, dolastatin 10, maytansine, rhizoxin, paclitaxel, a paclitaxel derivative, thiocolchicine, trityl cysteine, vinblastine sulfate, vincristine sulfate, epothilone A, epothilone B, discodermolide, estramustine, nocodazole, or MAP4.

8. The method according to claim 6 wherein said natural product is a vinca alkaloid, an antitumor antibiotic, an enzyme, lymphokine, epipodophyllotoxin, Vinblastine, Vincristine, Vindesine, Bleomycin, Dactinomycin, Daunorubicin, Doxorubicin, Epirubicin, Idarubicin, Ara-C, Mithramycin, Deoxyco-formycin, Mitomycin-C, L-Asparaginase, an Interferon, Etoposide, or Teniposide.

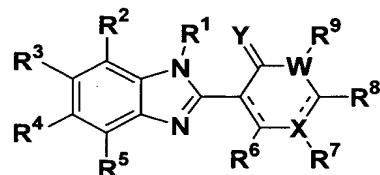
9. The method according to claim 6 wherein said platinum coordination complex is cisplatin or carboplatin.

10. The method according to claim 1 wherein said cytotoxic agent is etoposide.

11. The method according to claim 1 wherein said cytotoxic agent is cisplatin or carboplatin.

12. The method according to claim 1 further comprising the administration of an additional anticancer agent.

13. The method according to claim 1 wherein said IGF1R inhibitor has the following formula I



I

its enantiomers, diastereomers, pharmaceutically acceptable salts, hydrates, prodrugs and solvates thereof;

wherein

X is N, C₁-C₃ alkyl, or a direct bond;

Y is O or S;

W is N, C, O, or S; provided that if W is O or S, R⁹ is absent;

R¹ is H, alkyl, or alkoxy;

R² and R⁹ are independently H or alkyl;

R³ is H, C₁₋₆ alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, halo, amino, -OR⁶⁰, -NO₂, -OH, -SR⁶⁰, -NR⁶⁰R⁶¹, -CN, -C(O)R⁶⁰, -CO₂R⁶⁰, -CONR⁶⁰R⁶¹, OCONR⁶⁰R⁶¹, -NR⁶²CONR⁶⁰R⁶¹, -NR⁶⁰SO₂R⁶¹, -SO₂NR⁶⁰R⁶¹, -SO₂R⁶³, -C(NR⁶²)NR⁶⁰R⁶¹, -C(NH⁶²)-morpholine, aryl, heteroaryl, -(CH₂)_nC(O)R⁶⁰, -NR⁶⁰R⁶¹ -(CH₂)_nOR⁶⁰, -(CH₂)_nNR⁶⁰R⁶¹, -(CH₂)_nSR⁶⁰, -(CH₂)_naryl, -(CH₂)_nheteroaryl, or -(CH₂)_nheterocycloalkyl, wherein n is 1 to 3:

R⁴ is H, halo, alkyl or haloalkyl;

R⁵ is H, alkyl, halo, or aryl;

R⁶, R⁷, and R⁸ are each independently -NH-Z-aryl or -NH-Z-heteroaryl wherein Z is C₁ – C₄ alkyl, alkenyl, or alkynyl; Z optionally having one or more hydroxy, thiol, alkoxy, thioalkoxy, amino, halo, NR⁶⁰SO₂R⁶¹ groups; Z optionally incorporating one or more groups selected from the group consisting of CO, CNOH, CNOR⁶⁰, CNNR⁶⁰, CNNCOR⁶⁰ and CNNSO₂R⁶⁰;

R⁶⁰, R⁶¹, R⁶², and R⁶³ are independently selected from the group consisting of H, alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl, hydroxy, alkoxy, aryl, heteroaryl, heteroarylalkyl, and alkyl-R²⁵;

R²⁵ is hydrogen, alkenyl, hydroxy, thiol, alkoxy, thioalkoxy, amino, alkylamino, dialkylamino, aryl, heteroaryl, cyano, halo, sulfoxyl, sulfonyl, -NR³⁰COOR³¹, -NR³⁰C(O)R³¹, -NR³⁰SO₂R³¹, -C(O)NR³⁰R³¹, heteroaryl or heterocycloalkyl; and

R³⁰ and R³¹ are, independently, hydrogen, alkyl, or cycloalkyl.

14. The method according to 13 wherein R³ is an optionally substituted morpholine, thiomorpholine, sulfoxymorpholine, sulfonylmorpholine, or homomorpholine.

15. The method according to claim 13 wherein R³ is a substituted or unsubstituted piperazine or piperadine.

16. The method according to claim 13 wherein R^6 is -NH-Z-aryl, or -NH-Z-heteroaryl.
17. The method according to claim 16 wherein said aryl is a substituted or unsubstituted phenyl.
18. The method according to claim 16 wherein said heteroaryl is a substituted or unsubstituted pyridinyl, imidazolyl, pyrazolyl, pyrrolyl or triazolyl.
19. The method of claim 1 wherein the cytotoxic agent is paclitaxel, etoposide, or cisplatin and the IGF1R inhibitor is selected from the group consisting of:
(\pm)-4-[2-(3-Chloro-4-fluoro-phenyl)-2-hydroxy-ethylamino]-3-(6-imidazol-1-yl-4-methyl-1H-benzimidazol-2-yl)-1H-pyridin-2-one;
(S)-4-[2-(3-Fluoro-phenyl)-1-hydroxymethyl-ethylamino]-3-(6-imidazol-1-yl-4-methyl-1H-benzimidazol-2-yl)-1H-pyridin-2-one;
(\pm)-4-[2-(3-Chloro-phenyl)-2-hydroxy-ethylamino]-3-(6-imidazol-1-yl-1H-benzimidazol-2-yl)-1H-pyridin-2-one;
(S)-4-[2-(3-Chloro-phenyl)-2-hydroxy-ethylamino]-3-(4-methyl-6-morpholin-4-yl-1H-benzoimidazol-2-yl)-1H-pyridin-2-one;
(S)-2-[4-(2-{4-[2-(3-Chloro-phenyl)-2-hydroxy-ethylamino]-2-oxo-1,2-dihydro-pyridin-3-yl}-7-methyl-3H-benzoimidazol-5-yl)-piperazin-1-yl]-acetamide Bis hydrochloride;
(S)-4-[2-(3-Chloro-phenyl)-2-hydroxy-ethylamino]-3-{4-methyl-6-[4-(2-methylsulfanyl-ethyl)-piperazin-1-yl]-1H-benzoimidazol-2-yl}-1H-pyridin-2-one bis hydrochloride;
(S)-4-[2-(3-Chloro-phenyl)-2-hydroxy-ethylamino]-3-[4-methyl-6-(3R-methyl-piperazin-1-yl)-1H-benzoimidazol-2-yl]-1H-pyridin-2-one bis hydrochloride; and
(S)-4-[2-(3-Chloro-phenyl)-2-methoxy-ethylamino]-3-{6-[4-(2-hydroxy-ethyl)-piperazin-1-yl]-4-methyl-1H-benzimidazol-2-yl}-1H-pyridin-2-one.

20. A pharmaceutical composition comprising a synergistically effective amount of an IGF1R inhibitor in combination with a synergistically effective amount of a cytotoxic agent.